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On the Conjunction of Venus and Jupiter, 1892 *February* 5–6.
By A. Marth.

The close conjunction of *Venus* and *Jupiter*, predicted in the Almanacs as occurring on February 5 at 22^{h} Greenwich mean time, offers to observers in Australia, in Japan, and in adjacent terrestrial regions the rare chance of making the simple observations required for answering the question, What are the limits of angular distance within which such bright bodies can or cannot be separated by the naked eye? The geocentric distance between the centres of the two planets will be

			h m		h m	
within	3′	from	21 4	to	23 24	G.M.T.
„	2	„	21 29	„	22 59	„

As the observations require no artificial means except watches or clocks for knowing the correct time, and consist merely in watching the planets after sunset and noting the times when they cease to appear separated and when they begin to appear so again, it is to be hoped that the interesting phenomenon will be duly observed by very many pairs of eyes, and that the best use will be made of the rare opportunity.

On the present occasion the planets will be 33°·6 east of the Sun. On the last occasion, 1826 August 1, when a close conjunction of *Venus* and *Jupiter* took place in the evening, the angular distance from the Sun was 36°·2, and Australia was again favoured, but I do not know whether any observations were got at Paramatta. Since then a close morning conjunction occurred 1859 July 20, 16^{h} Greenwich mean time, but the planets were only 18°·5 west of the Sun, and no results of value were obtained.

The position-angle p and the angular distance s of the centre of the disc of *Venus* referred to that of *Jupiter* may be obtained by means of the formulæ

$$s \sin(p-\mathrm{P}) = x = x_0 - [0{\cdot}3498]\,\rho'' + [0{\cdot}6771]\,\rho' \sin(\mathrm{G}+\lambda)$$
$$s \cos(p-\mathrm{P}) = y = y_0 - [0{\cdot}6743]\,\rho'' - [0{\cdot}3577]\,\rho' \sin(\mathrm{H}+\lambda),$$

in which x_0 y_0 denote the geocentric rectangular coordinates of *Venus* referred to the axes of the disc of *Jupiter*, and x y the corresponding topocentric coordinates for a place in longitude λ east of Greenwich, the distance of which from the axis of the Earth is ρ', and from the plane of the equator ρ'' (reckoned negative for places on the south side). The logarithmic coefficients of ρ'' and ρ' are those for 22^{h} Greenwich and vary slightly, the values for 18^{h} being ·0004 smaller, and for 2^{h} ·0004 greater. The quantities x_0 y_0, G, H have the following values:—

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1892.	G.M.T. h	m	x_0	y_0	G	H
			″	″	°	°
Feb. 5	18	0	−635·19	−41·34	56·23	44·12
		20	585·21	·33	61·24	49·13
		40	535·23	·31	66·25	54·15
	19	0	−485·26	−41·29	71·26	59·16
		20	435·28	·28	76·27	64·17
		40	385·31	·26	81·28	69·19
	20	0	−335·34	−41·24	86·29	74·20
		20	285·37	·22	91·30	79·21
		40	235·40	·20	96·31	84·23
	21	0	−185·43	−41·17	101·32	89·24
		20	135·46	·15	106·33	94·25
		40	85·49	·13	111·34	99·27
	22	0	− 35·53	−41·10	116·35	104·28
		20	+ 14·44	·08	121·36	109·29
		40	64·40	·05	126·37	114·31
	23	0	+114·36	−41·02	131·38	119·32
		20	164·32	41·00	136·39	124·33
		40	214·28	40·97	141·40	129·35
Feb. 6	0	0	+264·24	−40·94	146·41	134·36
		20	314·20	·91	151·42	139·37
		40	364·15	·88	156·43	144·39
	1	0	+414·10	−40·85	161·44	149·40
		20	464·05	·82	166·45	154·41
		40	514·00	·78	171·46	159·43
	2	0	+563·94	−40·74	176·47	164·44

The values of the position-angle P of *Jupiter's* axis and of the apparent diameters of the disc may be taken from the ephemeris in vol. li. page 367. The assumed value of the diameter of *Venus* at distance 1 is 17″·552, q denotes the amount of the greatest defect of illumination, and Q its position-angle reckoned from the circle of declination, or Q − P the position-angle reckoned from the direction of the axis of *Jupiter*.

			♃'s *Diam.*			♀'s *Diam.*			
G.M.T.		P	Equat.	q	Polar.		q	Q	Q − P
	h	°	″	″	″	″	″	°	°
Feb. 5	18	334·708	34·04	0·11	31·87	13·52	2·31	68·5	93·8
6	2	·705	34·01	0·10	31·86	13·54	2·33		

The rectangular coordinates of the satellites referred to the axes of *Jupiter's* disc, and deduced from the data published in vol. li.,

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are for the times when *Venus* is passing in their neighbourhood, the following:—

	Sat. IV.	
G.M.T.	x_4	y_4
h m	″	″
19 0	−431·05	+3·96
20	430·38	4·01
40	429·70	4·06
20 0	−429·02	+4·11

	Sat. II.		
G.M.T.	x_2	Diff.	y_2
h m	″	″	″
21 0	−127·36	+1·16	+1·77
10	126·20	1·29	1·83
20	124·91	1·43	1·89
30	123·48	+1·56	1·95
21 40	−121·92		+2·01

	Sat. I.	
G.M.T.	x_1	y_1
	″	″
21 40	−64·68	−2·24
45	65·64	2·22
50	66·58	2·20
55	67·51	2·17
22 0	−68·43	−2·15

	Sat. III.	
G.M.T.	x_3	y_3
	″	″
23 40	+256·73	+0·70
50	·77	0·66
0 0	·80	0·62
10	·81	0·57
0 20	+256·81	+0·53

According to these data, the geocentric conjunctions of *Venus* with the satellites and with *Jupiter* will take place at the following Greenwich mean times:—

Sat. IV.	*Sat. II.*	*Sat. I.*	♃	*Sat. III.*
h m	h m	h m	h m	h m
19 22·0	21 24·5	21 47·7	22 14·2	23 57·0

the distances being

−45″·3	−43″·1	−38″·9	−41″·1	−41″·7

As the sum of the semidiameters of the two planets at the time of nearest approach is 22″·7, the distance between the nearest limbs will be, geocentrically, only 18″·4, and their distance will be reduced by parallax for Adelaide to 14″·0, for Sydney and Windsor to 13″·9, and for Melbourne to 13″·8.

Whether the satellites can be successfully observed in daytime remains to be tested.

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Ephemerides of the Satellites of Saturn, 1891–92. By A. Marth. (Continued.)

The adopted Zero-Meridian will pass the middle of the illuminated disc of Saturn at the following Greenwich mean times:—

1891.	h. m.	h. m.	1892.	h m.	h. m.
Dec. 22	11 56·8	22 11·1	Jan. 26	11 31·5	21 45·9
23	8 45·5	18 39·8	27	8 0·2	18 14·5
24	15 8·5	25 22·8	28	4 28·8	14 43·6
25	11 37·2	21 51·5	29	11 11·7	21 26·0
26	8 5·8	18 20·2	30	7 40·3	17 54·7
27	14 48·9	25 3·2	31	4 9·0	14 23·3
28	11 17·5	21 31·9	Feb. 1	10 51·9	21 6·2
29	7 46·2	18 0·6	2	7 20·5	17 34·8
30	14 29·2	24 43·5	3	3 49·1	14 3·4
31	10 57·9	21 12·2	4	10 32·1	20 46·4
1892.					
Jan. 1	7 26·6	17 40·9	5	7 0·7	17 15·0
2	14 9·5	24 23·9	6	3 29·3	13 43·6
3	10 38·2	20 52·5	7	10 12·2	20 26·5
4	7 6·9	17 21·2	8	6 40·8	16 55·1
5	13 49·9	24 4·2	9	3 9·4	13 23·7
6	10 18·5	20 32·9	10	9 52·3	20 6·7
7	6 47·2	17 1·5	11	6 21·0	16 35·3
8	13 30·2	23 44·5	12	2 49·6	13 3·9
9	9 58·8	20 13·1	13	9 32·5	19 46·8
10	6 27·5	16 41·8	14	6 1·1	16 15·4
11	13 10·4	23 24·8	15	2 29·7	12 44·0
12	9 39·1	19 53·4	16	9 12·6	19 26·9
13	6 7·7	16 22·0	17	5 41·4	15 55·5
14	12 50·7	23 5·0	18	2 9·8	12 24·1
15	9 19·3	19 33·6	19	8 52·8	19 7·1
16	5 48·0	16 2·3	20	5 21·4	15 35·7
17	12 30·9	22 45·2	21	12 4·3	22 18·6
18	8 59·6	19 13·9	22	8 32·9	18 47·2
19	5 28·2	15 42·5	23	5 1·5	15 15·8
20	12 11·1	22 45·5	24	11 44·4	21 58·7
21	8 39·8	18 54·1	25	8 13·0	18 27·3
22	8·4	15 22·7	26	4 41·6	14 55·9
23	1 51·4	22 5·7	26	11 24·6	21 38·9
24	8 20·0	18 34·3	28	7 53·2	18 7·5
25	4 48·6	15 2·9	29	4 21·8	14 36·1